

©CIM 1772

CARTER CINEMA

5 Oct 1920

Presents

THE LIVING WORLD

©C 1772

- An Outline of General Biology -

Compiled and Photographed

by

George E. Stone.

Produced at

The George E. Stone Laboratories
Berkeley, California.

World Rights Controlled by

- CARTER CINEMA -

220 W. 42d St., New York City
Copyright 1920 by

George E. Stone.

Passed by the National Board of Review.

Sub-Title 1. Biology is the science which treats of living things and all the facts which relate to life are properly included in this study.

Title dissolves.

Sub-Title 2.-First of all, let us fully realize what is meant by the term "Living Thing."

Sub-Title 3. Man, consciously or unconsciously, divides all material objects into two classes - the living and the non-living.

(Title fades out.)

Oct-2-1920

✓ Scene 1. (Circle in) Child playing on floor. Piles blocks, toys in one group and puts rabbit and chick in other.

Sub-Title 4. These, we say, are alive.

✓ Scene 2. Rabbit and chick, pretty active.

Sub-Title 5. These we say are not alive.

✓ Scene 3. Non-living objects - no action.

Sub-Title 6. On what facts do we base this division? What properties does the living thing possess which are not present in the stone? (dissolve)

Sub-Title 7. In general, there are THREE signs upon which we base our judgment.

Sub-Title 8. First: The living thing moves.

✓ Scene 4. Rabbit washed face. (Iris in and out.)

Sub-Title 9. The stone does not move.

✓ Scene 5. The stone lying as before.

Sub-Title 10. Second: The living thing feeds (Iris in and out)

✓ Scene 6. The Rabbit eating (Iris in and out)

Sub-Title 11. The stone does not feed.

✓ Scene 7. The stone as before (Iris in and out)

Sub-Title 12. Third: The Living Thing produces its kind.

✓ Scene 8. Rabbit and young (Iris in and out)

Sub-Title 13. The stone remains but one.

✓ Scene 9. The stone as before (Iris in and out)

Sub-Title 14. Observe in the following examples that it is only because a living thing has power to MOVE, to FEED or to REPRODUCE that we are able to recognize the presence of life.

Sub-Title 15. Microscopic life, moves -

✓ Scene 10.- Man adjusting microscope.

✓ Scene 11. Photomicrograph of several moving organisms.

Sub-Title 16. Microscopic life, feeds.

✓ Scene 12. Rotifer eating.

Sub-Title 17. Microscopic life reproduces its kind.

✓ Scene 13. Paramecium dividing.

Sub-Title 18. With higher forms of life it is the same.

✓ Scene 14. A group of scenes comprising Parrot and cracker, ✓
Dog, Cat lapping milk, ✓ Dragon Fly larvae eating ✓
tadpole, ✓ Snail, ✓ Chick, ✓ Turkey, ✓ Rabbit, Boys wres-
tling, ✓ Goat, ✓ Bee on flower, ✓ Horse and colt and
Mother and child. ✓

Sub-Title 19. To MOVE, to FEED, and to REPRODUCE is equally characteristic of Plants.

Sub-Title 20. Some plants move so quickly that the motion is clearly seen. For example - Mimosa, the sensitive plant.

✓ Scene 15. Hand touches plant which closes up.

Sub-Title 21. But usually the plant movements are so slow that the photographing must be "speeded-up" in order that motion may be demonstrated.

✓ Scene 16. Iris, ✓ Rose, ✓ Hollyhock, ✓ Apple Blossoms opening.

Sub-Title 22. Plants feed upon substances found in the earth and the air.

✓ Scene 17. Plant growing. ✓

Sub-Title 23. Plants reproduce either from cuttings or from seeds.

Scene 18. Plants growing, Box is divided; one half is labeled "cuttings" other half is labeled "Seeds". There grow side by side, Geranium Rose, Begonia, Strawberry, "Wandering Jew" and Lettuce, Turnip, Radish, Squash, etc.

Sub-Title 24. But if the power to move, to feed or to reproduce were the only proof of life, then many non-living things would be included with the living, -for example:
(dissolve into next)

Sub-Title 25. Metallic sodium placed on water moves rapidly.

✓ Scene 19. Hand drops sodium on water. It moves.

✓ Scene 20. Close up of Sodium on water.

Sub-Title 26. Various machines perform complex movements.

✓ Scene 21. Clock-work operating.

Scene 22. Locomotive running.

Sub-Title 27. The candle flame feeds on the wax.

✓ Scene 23. Candle burning.

Sub-Title 28. And crystals reproduce their kind.

✓ Scene 24. Crystal growing from tiny "seed crystal.

Sub-Title 29. Yet none of these objects is truly alive and all the suggestions of life phenomena are limited to superficial appearances.

Sub-Title 30. The living and the non-living have but two things in common.

Sub-Title 31. First: Mass, for gravity affects them alike.

✓ Scene 25. Rabbit and Rock on balance scales.

Sub-Title 32. Second: Elemental chemical composition - for analysis of living substance reveals no element which is not present in some non-living matter.

✓ Scene 26. Retort over flame to show chemical analysis.

Sub-Title 33. Behind, Physical Mass, Elemental Chemical Composition and the superficial characteristics of Feeding, Moving and Reproducing lie deeper and more fundamental distinctions.

(Fade into next)

Sub-Title 34. All living things are composed of a unique substance called Protoplasm which may be clearly seen in a microscopic animal - Amoeba.

✓ Scene 27 Man adjusting microscope.

✓ Scene 28 Amoeba crawling.

Sub-Title 35. Protoplasm is a transparent, jelly-like substance; a highly complicated organic compound which may be chemically analyzed into the elements, Carbon, Oxygen, Hydrogen, and Nitrogen, but it has never yet been produced artificially.

Sub-Title 36. Protoplasm in the cell of a plant.

✓ Scene 29. Plant cell, showing protoplasm.

Sub-Title 27. Protoplasm may be considered as the living substance of both plants and animals - The Physical Basis of Life.

Sub-Title 38. But not all of the substance of a living thing is Protoplasm. Associated with Protoplasm and produced by it there are usually found some inert substances, entirely life-less in themselves.

Sub-Title 39. Within the cells of a wild flower may be found crystals of oxalic acid.

✓ Scene 30. Man adjusting microscope.

✓ Scene 31. ^{Calcium oxalate} Oxalic acid and crystals in Trillium.

Sub-Title 40. Other examples are more familiar - Hair.

Scene. 32 Barber clipping boy's hair.

Sub-Title 41. Horn.

✓ Scene 33. Goat with horns.

Sub-Title 42. Hoof.

Scene 34. Blacksmith shoeing horse.

Sub-Title 43. Nail.

Scene 35. Baby, - hand to show nails.

Sub-Title 44. Beaks.

✓ Scene 36. Parrot beak.

Sub-Title 45. Shell.

✓ Scene 37. Snail shell.

Sub-Title 46. Scales of Reptiles and fishes.

✓ Scene 38. Lizard.

Scene 39. Fish to show scales.

Sub-Title 47. But no life can exist without protoplasm.

✓ Scene 40.- Ameoba crawling.

Sub-Title 48. Furthermore, Protoplasm characteristically shows a definite division into small units surrounded by thin supporting walls. The appearance of these units has suggested the name of "cells", - now universally accepted.

Sub-Title 49. Section of plant tissue magnified to show the cells.

Scene 41. Photomicrograph of plant cells.

Scene 42. The same, still larger.

Sub-Title 50. A typical cell consists of Protoplasm.

Scene 43. Diagram of a cell;

Labeled, 1. Protoplasm,

2.(surrounded by supporting walls)

1. Protoplasm is then drawn in.

2. Walls are then drawn in.

Sub-Title 51. The Protoplasm contains a number of microscopic structures most important of which is the Nucleus.

Scene 44. Diagram of cell (continued)

3. Nucleus is added and labeled.

Sub-Title 52. As the Protoplasm is considered as the physical Basis of Life so the cell is considered as the Unit of Life and the Dynamic Center of all life activities.

Scene 45. Cell as in 44.

Sub-Title 53. It is within the Protoplasm of the cell that there occurs the wonderful succession of energy changes from which result all the Phenomena of Life.

Sub-Title 54. Section of Animal Brain to show Cells.

Scene 46. Section as indicated.

Sub-Title 55. In the simplest plants and animals the entire body consists of a single protoplasmic cell.

- ✓ Scene 47. Microscopic of Protozoa.
- Sub-Title 56. In higher forms, the cells of the living thing are organized into Structures and Systems specialized for definite work.
- ✓ Scene 48. Acanthus Leaf.
- ✓ Scene 49. Flowers.
- ✓ Scene 49. Flowers.
- Sub-Title 59. Brain.
- ✓ Scene 50. Brain.
- Sub-Title 60. All living things are characterized by a profound irritability, which shows itself in the microscopic movements of the protoplasm itself.
- ✓ Scene 51. Protoplasmic streaming in Tradescantia hairs.
- Sub-Title 61. This irritability permits a living thing to react to its environment - sometimes directly as by contact.
- ✓ Scene 52. Snail on stone. Finger touches "horns" which are withdrawn.
- Sub-Title 62. Irritability long continued causes modification of growth. The sheltered cypress grows in beautiful normal symmetry.
- ✓ Scene 53. Symmetrical cypress.
- Sub-Title 63. The exposed cypress of the sea-coast grow away from the irritating winds.
- ✓ Scene 54. Wind twisted tree.
- Sub-Title 64. Irritation long continued through generations results in structural changes to fit the environment. These modifications are inherited.
- Sub-Title 65. The Desert; Hot with Little rain.
- ✓ Scene 55. A Desert, showing Cactus, etc.

Sub-Title 65-a. The Desert plants have lessened their surface and increased their bulk to conserve moisture.

✓ Scene 56. Desert Plants. Close up.

✓ Scene 57. Desert Plants Close up.

Sub-Title 66. The Sea: Tremendous in its power! !

✓ Scene 58. A wild, rocky sea coast - plants in foreground, waves breaking.

Sub-Title 67. The sea-plants have developed slender tough stems with buoyant leaves in order to withstand the waves.

✓ Scene 59. Body gathers together stems of sea plants.

✓ Scene 60. Close up of a buoyant leaf.

✓ Scene 61. Waves tearing at rocks, showing the sea-plants carried possibly by each wave.

Sub-Title 68. The Fertile Land: Sheltered and well watered with friendly soil. The plants grow with grace and delicacy.

Scene 62. A fertile meadow with woodlands in background.

Scene 63. Close up - delicate plant.

Scene 64. Close-up of another - fern.

Sub-Title 69. All living things go through a cycle of changes associated with their life history.

(fade into next)

✓ Sub-Title 70. The Hen produces an egg.

✓ Scene 65. Hen laying egg.

Sub-Title 71. This egg is a detached portion of the hen's body capable of further coordinated development.

✓ Scene 66. Close-up - egg.

Sub-Title 72. The developmental processes require warmth which is supplied by the body of the hen.

✓ Scene 67. Hen sitting on egg.

Sub-Title 73. After twenty- one days of development within the egg, the chick breaks the shell and is hatched.

- ✓ Scene 68. Hatching egg. (Fade in and out)
- ✓ Scene 69. Later stage - fade in - chick hatches - fade out.
- Sub-Title 74. The egg has produced a chick.
- ✓ Scene 70. Egg shell and chick.
- Sub-Title 75. All fluffed out.
- ✓ Scene 71. Chick and shell - as indicated.
- Sub-Title 76. The chick grows - - -
- ✓ Scene 72. Larger chick.
- Sub-Title 77. and becomes a hen, thus completing a cycle of life.
- Sub-Title 78. Furthermore, such life cycles establish a definite relationship between parent and offspring and the characters exhibited in the offspring are largely controlled as a result of such "Heredity"; for example,

fade into
- Sub-Title 79. The Hen's egg produced a chick.
- ✓ Scene 73. Egg slowly dissolves into small chick,
- Sub-Title 80. and not a pigeon
- Sub-Title 81. nor a turkey
- ✓ Scene 74. Young turkey.
- Sub-Title 82. Nor a duck
- ✓ Scene 75. Young Duck quacking.
- Sub-Title 83. This is the essence of HEREDITY, that certain characteristics of the offspring are INHERITED from some pre-existing life.
- Sub-Title 84. Life processes demand a favorable combination of physical and chemical conditions in order to proceed. At high temperature, long continued, life ceases.
- ✓ Scene 76. Test-tube over *Bunsen* burner.
- Sub-Title 85. At low temperatures, life ceases or becomes dormant.
- ✓ Scene 77. Test-tube packed in ice.

Sub-Title 86. It is only within a limited range of the thermometer that life Phenomena exist, and it is within a lesser range that life exists abundantly.

Scene 78. Thermometer in diagram - Farenheit scale on one side, Centigrade on other.
Animated diagram showing rise of mercury. As thermometer fluid rises, the labels indicate:

87C - 123°F . Only a few spores have temperature.

Thermometer rises to 0°C. Within this limit little life can exist and vital processes are almost non-existent.

0° C. at this temperature water freezes and the most living substance is killed by the freezing of the Protoplasm.

0°C. to 10°C. The Lowest limit of abundant life. Marine plants and animals of Artic seas or abysmal depths.

35°C. The average ideal temperature for Life Phenomena.

40°C. The normal temperature of most birds, but fatal to many organisms.

40-50°C. Most life is killed by coagulation of Protoplasm Albumen.

100°-C. Boiling point of water. Most organisms are destroyed at this temperature.

100-125°C This heat has been withstood by spores of certain Bacteria.

Sub-Title 86. When physical conditions are not favorable to life certain organisms become dormant.

Sub-Title 87. The cold Frog seems lifeless.

Scene 79. Cold Frog apparently lifeless.

Sub-Title 88. When the Frog is warmed activity returns.

Scene 80. Warming frog over fire.

Scene 81. The frog, fully alive.

Sub-Title 89. Seeds offer an example of dormant life.

✓ Scene 82. Seeds in hand.

Sub-Title 90. Moisture, warmth and oxygen are all that the dormant seeds require.

✓ Scene 83. Hand plants seeds, water them.

Sub-Title 91. A week's growth shown in ten seconds.

✓ Scene 84. Growing seeds.

Sub-Title 92. There are degrees and qualities of life.

Sub-Title 93. Life processes are less active.

Scene 85. Sleepy child.

Sub-Title 94. Life processes are fully active.

Scene 86. Child awake

Sub-Title 95. The Hare and the Tortoise - a classic example.

Scene 87. Hare and Tortoise.

Sub-Title 96. The inactive Mollusc.

Scene 88. Mussels on rock.

Sub-Title 97. The active bird.

Scene 89. Active bird.

Sub-Title 98. One final characteristic of all life is that, however the organism may thrive, there comes a time when all life processes cease and the living thing dies.

✓ Scene 90. Flower growing, blooming; suddenly wilting and collapsing.

Sub-Title 99. The life span varies from a few hours to many years.

Sub-Title 100. The adult May-fly lives but for a day.
dissolve into

Scene 91. May-fly

Sub-Title 101. The Giant Redwoods have withstood the elements for more than two thousand years.

✓ Scene 92. Giant Redwoods.

Sub-Title 102. But whether short or long, there comes a time when all vital functions cease - the organism is dead.

(Dissolve)

Sub-Title 103. But although the individual organism dies, the life stream flows on. Death is a phenomenon of the individual and not the race.

(Dissolve)

Sub-Title 104. The great tree falls in the forest

✓ Scene 93. Fallen great cypress.

Sub-Title 105. But at its base is growing up another generation to take its place.

✓ Scene 94. Young trees growing against torn-up roots of fallen tree.

Sub-Title 106. The seeds of the faded plant retain the power to duplicate the parent a hundred fold.

✓ Scene 95. Hand gathering seeds from withered plant.

Scene 96. Close-up of hand holding seeds.

Sub-Title 107. All Life processes, however simple, occur only through release of energy.

✓ Scene 97. Chick yeeping

Sub-Title 108. In this, the living thing is as much a machine as is any of man's inventions and is subject to the same laws of physics and chemistry.

✓ Scene 98. Locomotive pulling load.

Scene 99. Fire horses running with engine.

Sub-Title 109. In a machine, the energy is derived from some external source.

✓ Scene 100. Fire under boiler of engine.

Sub-Title 110. In the living thing the energy is derived from the breaking down of the very substance of the body.

Scene 101. Men straining for start of race.

- Scene 102. Hurdle race.
- Scene 103. Close-up of panting, violently exerted winner.
- Sub-Title 111. The living thing must be regarded as in a state of constant flux. The simplest activities of life involve destruction of living substance.
- Scene 104. Sleeping child.
- Sub-Title 112. When a candle burns—
- ✓ Scene 105. Candle burning.
- Sub-Title 113. The Carbon and Hydrogen of the wax unite with the oxygen of the air to form carbon dioxide and water while energy is released in the form of heat and light
- Scene 106. Diagram of candle flame showing union of carbon and hydrogen with oxygen with release of energy.
- Sub-Title 114. Carbon Dioxide and water vapor may be demonstrated in the escaping gas of a burning candle.
- Scene 107. Demonstrating water vapor against cold glass.
- Scene 108. Demonstrating Carbon Dioxide.
- Sub-Title 115. The same two substances result from the activities of life. Oxygen is inhaled into the lungs, unites with Carbon and Hydrogen of body tissue and Carbon Dioxide and water are exhaled.
- ✓ Scene 109. Child breathes against mirror which becomes fogged.
- ✓ Scene 110. Child blows through lime water which becomes clouded.
- ✓ Scene 111. Close-up-clouded lime water.
- Sub-Title 116. The source of energy for living things is derived from substances called foods.
- Scene 112-a. Diagram of ^{living} ~~lung~~ substance

Living substance

(continued
next page)

Foods
and respiration products
shown entering living thing.

Carbon dioxide and excretory
products shown leaving liv-
ing thing.

Energy release indicated.

The upbuilding processes are called Anabolism.

The destructive processes are called Kotabolism.

The combination of constructive and destructive forces is termed Metabolism and is the most characteristic and fundamental prop-
erty of living matter.

Sub-Title 116-a. Living substance is thus in a continued state
of flux in which the organism retains a con-
stant identity although composed of inconstant
elements. In this sense it resembles a flame.

✓ Scene 112-b. Flame

Sub-Title 116-b. Or a waterfall

Scene 112-c. Waterfall

Sub-Title 116-c. When Anabolism exceeds Kotabolism, the organ-
ism grows.

Scene 112-d. Diagram showing organism growing.

Sub-Title 116-d. When Kotabolism exceeds Anabolism the organism
declines or dies.

Scene 112-e. Diagram showing organism declining and shrinking.

Sub-Title 116-e. We are now prepared for our definition of Life.

(Dissolve)

Sub-Title 116-f. Life is the name which we apply to character-
istic phenomena, actual or latent, based upon
the metabolism of Proteids.- H.B.Torrey.

(fade)

- Sub-Title 117. Plants possess the unique property of producing food directly from the soil and the air.
- Sub-Title 118. The green substance of plants, called Chlorophyll, may be extracted by hot alcohol.
- ✓ Scene 113. Demonstration of Chlorophyll.
- Sub-Title 119. Leaves with and without Chlorophyll.
- ✓ Scene 114. Leaves with and without Chlorophyll.
- Sub-Title 120. The Chlorophyll of plants in the presence of sunlight possesses the power of combining Carbon Dioxide from the air and water from the earth to produce starch and release oxygen.
- Scene 115. Diagram showing action of sunlight upon Chlorophyll of leaf with production of Dextrose and oxygen.
- Sub-Title 121. The chemical agents of the plant convert sextros into starches, and other carbohydrates, proteins and fats. These substances constitute the ultimate food supply of the plant and animal world.
- Sub-Title 122. All vital processes require oxygen. Seeds deprived of oxygen will not germinate.
- Scene 116. Seeds under two bell jars, one labeled "Jar contains oxygen," the other, "Oxygen removed by chemical means." Seed grow in one and not in other.
- Sub-Title 123. Animals deprived of oxygen will die but we will not subject our Rabbit to cruel experiment.
- Scene 117. Child and Rabbit.
- Sub-Title 124. Hold your breath a moment and you will realize that you need oxygen.
- ✓ Scene 118. Child holds its breath a moment, then releases and takes quick breath.
- Sub-Title 125. Although all plants require oxygen just as do animals, the activity of chlorophyll in sunlight produces oxygen in excess of the needs of the plant. In an experiment this may be demonstrated.

- ✓ Scene 119. Man places green plant in water, thrusting stems into inverted test tube.
- ✓ Scene 120. Close-up of arrangement.
- Sub-Title 126. The escaping gas is oxygen, as may be demonstrated.
- ✓ Scene 121. Man removes test tube and thrusts glowing splinter into it. Splinter bursts into flame.
- Sub-Title 127. In the living world the plants and animals are mutually dependent.
(Dissolve)
- Sub-Title 128. The green plant releases oxygen which it produces in excess of its volume of Carbon Dioxide.
(Dissolve.)
- Sub-Title 129. The animals absorb oxygen and release an equal volume of Carbon Dioxide.
(Dissolve)
- Sub-Title 130. The transformation of the carbon compounds within plant and animal tissue provides the energy to sustain life phenomena.
(Dissolve)
- Sub-Title 131. It is thus possible to construct an aquarium containing both plants and animals in which one form of life will just sustain and balance the other.
- Scene 122. A balanced aquarium.
- Sub-Title 132. As we gaze into the clear waters of our balanced community, we see in miniature, the living world in which we dwell.
- Scene 123. Child gazing into balanced aquarium. The scene dissolves into a world revolving. The aquarium fades from view and we see a world revolving in space.

---:0:---

The End.

This document is from the Library of Congress
“Motion Picture Copyright Descriptions Collection,
1912-1977”

Collections Summary:

The Motion Picture Copyright Descriptions Collection, Class L and Class M, consists of forms, abstracts, plot summaries, dialogue and continuity scripts, press kits, publicity and other material, submitted for the purpose of enabling descriptive cataloging for motion picture photoplays registered with the United States Copyright Office under Class L and Class M from 1912-1977.

Class L Finding Aid:

<https://hdl.loc.gov/loc.mbrsmi/eadmbrsmi.mi020004>

Class M Finding Aid:

<https://hdl.loc.gov/loc.mbrsmi/eadmbrsmi.mi021002>



National Audio-Visual Conservation Center
The Library of Congress